Limb, these Rays, being by the *Atmosphere* inflected, appear to the eye at E, as if they had come from the points, N and O; and because the Ray L has a greater inclination upon the inequality of the *Atmosphere* then I, therefore must it suffer a greater inflection, and consequently be further elevated above its true place, then the Ray I, which has a less inclination, will be elevated above its true place; whence it will follow, that the lower side appearing neerer the upper then really it is, and the two *lateral* sides, *viz.* the right and left side, suffering no sensible alteration from the inflection, at least what it does suffer, does rather increase the visible Diameter then diminish it, as I shall shew by and by, the Figure of the luminous body must necessarily appear somewhat *Elliptical.*

This will be more plain, if in the seventh *Figure* of th 37. *Scheme* we suppose A B to represent the sensible Horizon; C D E F, the body of the Sun really below it; G H I K, the same appearing above it, elevated by the inflection of the *Atmosphere*: For if, according to the best observation, we make the visible Diameter of the Sun to be about three or four and thirty minutes, and the Horizontal refraction according to *Ticho* be thereabout, or somewhat more, the lower limb of the Sun E, will be elevated to I; but because, by his account, the point C will be elevated but 29. minutes, as having not so great an inclination upon the inequality of the Air, therefore I G, which will be the apparent refracted perpendicular Diameter of the Sun, will be less then C G, which is but 29. minutes, and consequently six or seven minutes shorter then the unrefracted apparent Diameter. The parts, D and F, will be likewise elevated to H and K, whose refraction, by reason of its inclination, will be bigger then that of the point C, though less then that of E; therefore will the semidiameter I L, be shorter then L G, and consequently the under side of the appearing Sun more flat then the upper.

Now, because the Rays from the right and left sides of the Sun, *&c.* have been observ'd by *Ricciolo* and *Grimaldus*, to appear more distant one from another then really they are, though (by very many Observations that I have made for that purpose, with a very good *Telescope*, fitted with a divided Ruler) I could never perceive any great alteration, yet there being really some, it will not be amiss, to shew that this also proceeds from the refraction or inflection of the *Atmosphere*; and this will be manifest, if we consider the *Atmosphere* as a transparent Globe, or at least a transparent shell, encompassing an opacous Globe, which, being more dense then the *medium* encompassing it, refracts or inflects all the entring parallel Rays into a point or focus, so that wheresoever the Observator is plac'd within the *Atmosphere*, between the focus and the luminous body, the *lateral* Rays must necessarily be more converg'd towards his eye by the refraction or inflection, then they would have been without it; and therefore the Horizontal Diameter of the luminous body must necessarily be augmented.

This might be more plainly manifest to the eye by the sixth *Figure*; but because it would be somwhat tedious, and the thing being obvious enough

enough to be imagin'd by any one that attentively consi
ther omit it, and proceed to shew, that the mass of Air n
theEarth, consists, or is made up, of parcels, which do very
one another in point of density and rarity; and consequ
light that pass through them will be variously inflected, h
there another, according as they pass so or so through thos
and those parts being always in motion, either upwards o
to the right or left, or in some way compounded of thes
their motion inflect the Rays, now this way, and presen

This irregular, unequal and unconstant inflection of t
is the reason why the limb of the *Sun*, *Moon*, *Jupiter*, *S*
Venus, appear to wave or dance; and why the body of
to tremulate or twinkle, their bodies, by this means, bei
gnify'd, and sometimes diminished; sometimes elevated,
press'd; now thrown to the right hand, and then to the

And that there is such a property or unequal distribu
manifest from the various degrees of heat and cold that
Air; from whence will follow a differing density and
quantity and refraction; and likewise from the vapour
pos'd, (which, by the way, I imagine, as to refraction or
the same thing, as if they were rarify'd Air; and that th
ascend, are both lighter, and less dense, then the ambien
them up; and that those which descend, are heavier
The first of these may be found true, if you take a goo
Glass, and heating it pretty hot in the fire, lay it upon su
of Glass, or hang it in the open Air by a piece of W
upon some far distant Object (such as a Steeple or Tre
from that Object pass directly over the Glass before the
you shall find such a tremulation and wavering of the r
will very much offend your eye: The like tremulous
observe to be caus'd by the ascending steams of Wat
Now, from the first of these it is manifest, that from the
parts of the Air, by heat, there is caus'd a differing refrac
ascension of the more rarify'd parts of the Air, which ar
colder, and therefore more condens'd and heavie, is
tion or wavering of the Object; for I think, that th
will grant, that Glass, by as gentle a heat as may be
hand, should send forth any of its parts in steams or vap
not seem to be much wasted by that violent fire of the g
but, if yet it be doubted, let Experiment be further m
dy that is accounted, by Chymists and others, the mo
fix'd in the world; for by heating of a piece of Gold, a
the same manner, you may find the same effects.

This trembling and shaking of the Rays, is more sen
actual flame, or quick fire, or any thing else heated gl
a Candle, live Coal, red-hot Iron, or a piece of Silver,
same also appears very conspicuous, if you look at a